muscular contractions, movements of the members of the corresponding side; and if the irritation is still more intense, there follow movements of all four limbs; those of the corresponding side being most violently agitated.

THE RHOMBOIDAL SINUS IN BIRDS.—At the *séance* of the Soc. de Biologie, July 29. (rep. in *Gaz. des Hopitaux*) M. Duval offered a communication on the rhomboidal sinus of birds, and exhibited microscopic specimens in support of his opinion, that the rhomboidal sinus, instead of being simply formed by a cavity, as many physiologists think, is on the other hand, exactly filled by a continuous substance, which is nothing else than the ependymar neuroglia.

A NEW CEREBRAL CONVOLUTION.—M. Luys called the attention of the Soc. des. Biologie, at its session of June 24th, (rep. in *Le Progres Médical*) to the existence in certain cases, of a supplementary cerebral convolution parallel to and behind the ascending parietal convolution. He had met with it in two women, dying, one at eighty, the other at ninety-eight years of age, without ever having given evidence of any disorders of sensation, motility or intelligence. Moreover, this supplementary convolution, which is met with in many cases, is always found only on the left side. It will be of interest to ascertain whether or not it indicates a more perfect, cerebral development.

THE PHYSIOLOGY OF THE CEREBELLUM.—The following are the results of a series of experimental researches by Prof. H. Nothnagel, and published in a preliminary communication in the *Centralblatt f. d. Med. Wissensch.* No. 22.

1. The cerebellum is mechanically irritable by very minute needle pricking.

2. The motor phenomena due to its excitation, may be induced by irritation of various points in the hemispheres and the vermis; it is not necessary that the mechanical irritation shall reach the deeper lying parts near the radiating fibres from the crus.

3. Mechanical irritation of one hemisphere of the cerebellum causes motor phenomena, first on the same side, then on the opposite side of the body; the same effect follows irritation of one side of the vermis. Irritation of the vermis in the middle line, causes simultaneous bilateral motor phenomena.

4. The greater portion of (*a*) one hemisphere, or (*b*) of both hemispheres,—*i. e.*, with the exception of the direct radiating fibres from the crura,—or (*c*) the whole anterior (frontalward), and upper (dorsal) parts of the vermis may be destroyed, and the animal betray no effects for days.

5. Destruction of a particular part of the vermis, on the other hand, produce well-marked motor symptoms, durable in their character, which agree with those described by Flourens,

The animals employed in these experiments were rabbits. A more extended account of them is promised.

THE CONTRACTION AND INNERVATION OF THE SPLEEN.—J. Bulgak, of Moscow, has investigated the innervation of the spleen, and publishes the results in the *Centralblatt f. d. Med. Wissensch.* No. 33, Aug. 12. After giving the details of the method of his experiments, which were performed on dogs, and with the use of a weak induced current, he states the general results in substance, as follows;

There are two kinds of nerves going to the spleen, centripetal and centrifugal. The irritation of the central portion of the divided centripetal nerve, produces a strong contraction of the spleen, and pain, indicated by groaning and tremor on the part of the animal, while irritation of its peripheral portion causes no such effect; on the other hand, irritation of the central end of a divided centrifugal nerve is without result, while that of its peripheral portion causes a corresponding contraction of the portion it supplies. Division of a centripetal nerve causes no contraction; while that of a centrifugal one produces a local circumscribed swelling, and blueness of the organ. Direct passage of the current between electrodes placed on the surface of the organ, causes merely the contraction of a limited tract directly between them. The contraction begins with a paleness and somewhat knotty or granular appearance, which increases with the excitation, the organ becoming smaller and harder. After the discontinuance of the current, it gradually returns to the normal condition.

In order to determine the influence of the contraction or dilatation of the spleen upon the number of white globules passing out by the vena lienalis, the author made careful experiments to this end, counting the globules in a given quantity of blood issuing from the spleen in all conditions. He found the maximum number in the normal condition, a lesser number from the contracted spleen, and the minimum when it was dilated; but if, by any circumstances, the previously swollen spleen is brought to contract, their number is much increased.

The contraction of the spleen is influenced by the number of conditions. (1) It is weakened by curare and lasting narcosis; deep narcosis also makes the spleen flaccid, blue, and soon destroys its contractility. (2) Injection of quinine into the veins, causes contraction of the spleen and with it, increase of the white corpuscles. (3) Ergot causes no splenic contraction, not even large doses, such as usually produce strong contractions of the vessels of the uterus and intestines. (4) Asphyxia, and especially any gradual obstruction to the exchange of gases in the blood induces an extensive general contraction of the spleen, likewise of the vascular system throughout the body. (5) Irritation of the peripheral portion of the divided sympathetic, in the middle and lower cervical region, causes no contraction of the spleen; but that of the central portion in the middle cervical region, causes a strong contraction only with a powerful current that induces convulsion of the diaphragm, and stoppage of respiration (a peculiar kind of asphixia). A still more violent contraction is produced, when the central end of the superior laryngeal nerve is irritated with a powerful current, a proceeding which as is well known, causes stoppage of the breathing in expiration and relaxation of the dia-

phragm. In both cases it is evident, the whole phenomenon is to be referred to interrupted exchange of gases. (6) Irritation of the semilunar ganglion also causes a powerful and general contraction of the spleen (in dogs and rabbits). (7) Simple atmospheric air causes no effect on the spleen, other than drying and cooling it.

Since irritation of the central portions of the centripetal splenic nerves causes a general contraction of the organ; this phenomenon must be considered as a reflex one, given out from some reflex centre; but since after the section of the splanchnic nerves (before their entry into the cœliac ganglion), this reflex phenomenon fails to appear, we must look for this reflex centre at some higher point, somewhere in the spinal cord. To find this, the whole length of the spinal cord was investigated (by means of fine needles inserted): by this means the region of the roots of each pair of spinal nerves was tested, and the following results obtained: (1) Irritation of the cord at the level of the membrana obturatoria atlantis superior, either in the middle line or at the side, under no circumstances produced the slightest splenic contraction, but moderate irritation of the portion of the cord corresponding to the atlas, at once induced a strong contraction of the whole organ. (2) Also, after section of the cord at the level of the membrana obturatoria atlantis superior, that is, below the medulla oblongata (with curare and artificial respiration), the irritation of the central portion of divided centripetal splenetic nerves always causes as strong and general a contraction as before the section of the cord; hence, the reflex centre evidently is situated below the medulla oblongata. (3) Irritation of the parts of the cord below, down to the fourth cervical vertebra, always causes a considerable contraction, which, however, becomes weaker as the irritation is made below the fourth cervical vertebra in the lower portions of the cord. Below the eleventh dorsal, the irritation of the cord causes no contraction.

From these facts the following conclusions may be drawn: (1) In the upper part of the cord, between the first and fourth cervical vertebra, lies the mass of ganglion cells, which sends out the impulse for the spleen to contract (the desired reflex and motor centre). (2) Below the fourth cervical vertebra, however, the cord only includes, as regards the spleen, the centripetal and centrifugal fibres for that organ, and these, on account of their leaving the cord for their peripheral course, are all the while diminishing in number as we descend. It is not understood that the vasomotor fibres of the spleen are excited from this centre; but those of the muscular apparatus of the splenic capsule and trabeculæ, which are the parts specially involved in producing contraction and dilatation. It is possible that vaso motor fibres are included in this centre, which pass from the parts above, (somewhere in the medulla) and this accounts for the usual simultaneous contraction of the musculature and the vessels of the spleen, but the facts given of the splenic contraction after separation of the medulla from the cord, authorize the view that the apparatuses are separate.

Next, seeking out the peripheral conductors from the spleen to the nerve centres, it was found that they were lacking in both the cervical

and thoracic portions of the vagus. Irritation, however, of the splanchnic nerves in the thoracic cavity, above and below the diaphragm, showed that both the centrifugal and centripetal fibres are contained exclusively in the N. splanchnicus major sinister; the irritation of the peripheral end of which caused an enduring and considerable contraction of the spleen, while that of its central end only produced pain. Experiments on the corresponding nerve of the right side and on the lesser splanchnic nerve were without effect.

Direct electrical irritation of the left anterior spinal roots with a weak induced current, showed that contractions could be induced, between the third and tenth thoracic vertebra; but irritation of other anterior roots, above as well as below, gave on the left side, only negative results. It indicated also that the centrifugal splenic nerve fibres left the cord by several roots, since irritation of only one caused but a slight contraction.

THE STRUCTURE OF THE MEDULLARY NERVE SHEATH.—J. McCarthy, (*Quarterly Journal of Micr. Science*, 1875, 372, noticed in *Centralbl. f. d. Med. Wissensch.*,) calls attention to a peculiar appearance of the medullary sheaths of nerve fibres, when treated with simple chromate of ammonia. It seems to be made up of little rods lying in a direction perpendicular to the axis of the fibre, and giving an appearance somewhat like that of striped muscular fibre. This must not be confounded with the striated appearance of the axis cylinder described by Frommann, Grandry, and others. The author calls attention, also, to the fact that Lautermann (*Centralbl.* 1874, 706) had likewise noted a striated appearance of the medullary sheath, after treatment with osmic acid.

THE STRUCTURE OF THE SPINAL GANGLIA.—Holl, *Sitzungsb. d. k. Akad. d. Wissensch.* Wien. 1876. (Abst. in *Revue des Sci. Medicales.*) The author seeks to solve the questions as to what is the structure of the posterior spinal ganglia; whether the same number of fibres enter and leave them, each cell being simply interposed on the track of a nerve; or whether the ganglion gives rise to new fibres. He chose the method of conuting the fibres above and below the ganglion, to answer these queries, the same as that already employed by R. Wagner, who favored the view that the cells were bipolar. Hall found that there was no notable increase in fibres, after leaving the ganglion; the slight, apparent increase, he concludes to be an error in counting, and that no new fibres arise.

THE NUCLEUS OF THE FACIAL NERVE.—At the session of the Soc. de Biologie, July 1, (rep. in *Le Progres Medical*,) M. Duval gave a short summary of his researches on the disposition of the facial in the medulla. To reach its double nucleus, this nerve follows a very complex route, resembling in its windings that followed by the aqueduct of Sylvius. The first of these nuclei, the *genou* of the facial, is common to it and the motor oculi externus. The second, the true nucleus of the nerve, situated under the superficial layers of the circular fibres, is placed near the superior